

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previous Amended): An apparatus for embedding data in information material, said data including a plurality of data items, said data items having a different relative importance with respect to each other, said apparatus comprising:

an encoding processor operable to encode each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code;

a combining processor operable to combine said encoded data items with said information material; and

a control processor operable to receive data indicative of said relative importance of said data items to be embedded and to control said encoding processor and said combining processor to encode and embed said data items in accordance with said relative importance,

wherein said combining processor is operable in combination with said encoding processor to allocate an amount of a limited data embedding capacity provided by said information material, to generate an amount of said redundant data included in said encoded data items in accordance with said allocation, each of said data items being encoded and embedded to the effect that a proportion of said limited data embedding capacity is allocated to said encoded data items in accordance with said relative importance, and to embed control information in the information material indicative of at least one of the encoding and embedding applied to said data items.

Claim 2 (Original): An apparatus as claimed in claim 1, wherein said encoding processor includes a modulator operable to generate predetermined data sequences and to encode said data items by modulating said predetermined data sequences with data symbols

of said data items, and to combine said modulated predetermined data sequences with said information material.

Claim 3 (Original): An apparatus as claimed in claim 2, wherein said predetermined data sequences are Pseudo-Random Symbol or Bit Sequences.

Claim 4 (Original): An apparatus as claimed in claim 1, wherein said data items include meta data describing the content or providing an indication of an attribute of said information material in which the data is embedded.

Claim 5 (Original): An apparatus as claimed in claim 4, wherein said meta data includes a Unique Material Identifier (UMID), said UMID being given a higher predetermined relative importance than other meta data..

Claim 6 (Original): An apparatus as claimed in claim 5, wherein said UMID includes a plurality of data fields each of said fields representing a data item, each of said fields having a different relative importance.

Claim 7 (Original): An apparatus as claimed in claim 1, wherein said combining processor is operable in combination with said encoding processor not to embed selected data items if said limited capacity has been reached.

Claim 8 (Cancelled).

Claim 9 (Original): An apparatus as claimed in claim 1, wherein said information material is an image.

Claim 10 (Previously Presented): An apparatus for embedding data in information material, said data including a plurality of data items, said data items having a different relative importance with respect to each other, said apparatus comprising:

an encoding processor operable to encode each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code;

a combining processor operable to combine said encoded data items with said information material in accordance with an application strength; and

a control processor operable to receive data indicative of said relative importance of said data items to be embedded and to control said encoding processor and said combining processor to encode and embed said data items in accordance with said relative importance,

wherein said combining processor is operable in combination with said encoding processor to allocate an amount of a limited data embedding capacity provided by said information material, as each of said data items being encoded and embedded to the effect that said proportion of said limited data embedding capacity and said application strength are allocated to said encoded data items in accordance with said relative importance and to embed control information in the information material indicative of at least one of the encoding and embedding applied to said data items.

Claim 11 (Original): An apparatus as claimed in claim 10, wherein said encoding processor includes a modulator operable to generate predetermined data sequences and to encode said data items by modulating said predetermined data sequences with data symbols

of said data items, and to combine said modulated predetermined data sequences with said information material.

Claim 12 (Original): An apparatus as claimed in claim 11, wherein said predetermined data sequences are Pseudo-Random Symbol or Bit Sequences.

Claim 13 (Original): An apparatus as claimed in claim 10, wherein said data items include meta data describing the content or providing an indication of an attribute of said information material in which the data is embedded.

Claim 14 (Original): An apparatus as claimed in claim 13, wherein said meta data includes a Unique Material Identifier (UMID), said UMID being given a higher predetermined relative importance than other meta data.

Claim 15 (Original): An apparatus as claimed in claim 14, wherein said UMID includes a plurality of data fields each of said fields representing a data item, each of said fields having a different relative importance.

Claim 16 (Original): An apparatus as claimed in claim 10, wherein said combining processor is operable in combination with said encoding processor not to embed selected data items if said limited capacity has been reached.

Claim 17 (Cancelled).

Claim 18 (Previously Presented): An apparatus as claimed in claim 10, wherein said information material is an image.

Claim 19 (Previously Presented): An apparatus for embedding data in information material, said data including a plurality of data items, said data items having a different relative importance with respect to each other, said apparatus comprising:

an encoding processor operable to encode each of said data items;

a combining processor operable to combine said encoded data items with said information material, encoding processor including a modulator operable to generate predetermined data sequences and to encode said data items by modulating said predetermined data sequences with data symbols of said data items, and to combine said modulated predetermined data sequences within a limited data embedding capacity provided by said information material; and

a control processor operable to receive data indicative of said relative importance of said data items to be embedded and to control said encoding processor and said combining processor to encode and embed said data items in accordance with said relative importance,

wherein said predetermined data sequences are allocated to the effect that a greater amount of spreading of said data items is provided to the more important data items in accordance with said limited data embedding capacity and the control processor is operable to embed control information in the information material indicative of at least one of the encoding and embedding applied to said data items.

Claim 20 (Previously Presented): An apparatus as claimed in claim 19, wherein said predetermined data sequences are Pseudo-Random Symbol or Bit Sequences.

Claim 21 (Previously Presented): An apparatus as claimed in claim 19, wherein said data items include meta data describing the content or providing an indication of an attribute of said information material in which the data is embedded.

Claim 22 (Previously Presented): An apparatus as claimed in claim 19, wherein said meta data includes a Unique Material Identifier (UMID), said UMID being given a higher predetermined relative importance than other meta data.

Claim 23 (Previously Presented): An apparatus as claimed in claim 19, wherein said UMID includes a plurality of data fields each of said fields representing a data item, each of said fields having a different relative importance.

Claim 24 (Previously Presented): An apparatus as claimed in claim 19, wherein said combining processor is operable in combination with said encoding processor not to embed selected data items if said limited capacity has been reached.

Claim 25 (Cancelled).

Claim 26 (Previously Presented): An apparatus as claimed in claim 19, wherein said information material is an image.

Claim 27 (Previously Presented): An apparatus for detecting and recovering data embedded in information material the data including a plurality of data items having a different relative importance with respect to each other, the data having been encoded and embedded in accordance with a different relative importance, an amount of redundant data

being included in said encoded data items in accordance with the relative importance, each of said data items being encoded and embedded to the effect that a proportion of said limited data embedding capacity is allocated to said encoded data items in accordance with said relative importance, and the data includes control information indicative of at least one of the encoding and embedding applied to said data items, said apparatus comprising:

a detection processor operable to detect and to generate a recovered version of said embedded encoded data items from said information material and said control information; and

a decoding processor operable to decode and to recover said data items in accordance with the encoding applied to said recovered encoded data items according to the relative importance of said data items, wherein said detection processor is operable to detect and to recover said control information, and in accordance with said control information to decode and to recover said data items.

Claim 28 (Previously Presented): A method of embedding data in information material, said data being a plurality of data items each having a different relative importance, said method comprising:

receiving data indicative of said relative importance of said data items to be embedded;

encoding each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code;

combining said encoded data items with said information material; and

controlling the encoding and the combining of said data items to the effect that an amount of said redundant data included in said encoded data items is allocated in accordance with said relative importance to the effect that a proportion of said limited data embedding,

capacity is allocated to said encoded data items in accordance with said relative importance;
and

embedding control information in the information material indicative of at least one of
the encoding and embedding applied to said data items.

Claim 29 (Previously Presented): A method of embedding data in information
material, said data being a plurality of data items each having a different relative importance,
said method comprising:

receiving data indicative of said relative importance of said data items to be
embedded;

allocating an amount of a limited data embedding capacity provided by said
information material in accordance with an application strength;

encoding each of said data items in accordance with at least one error correction code,
said encoded data items including redundant data introduced by said error correction code, an
amount of said redundant data included in said encoded data items being allocated in
accordance with said relative importance;

combining said encoded data items with said information material; and

embedding control information in the information material indicative of the encoding
and embedding applied to said data items,

wherein said allocating and generating has an effect that a proportion of said limited
data embedded capacity is allocated to said encoded data items in accordance with said
relative importance, and said application strength are allocated to said encoded data items in
accordance with said relative importance.

Claim 30 (Previously Presented): A method of embedding data in information material, said data being a plurality of data items each having a different relative importance, said method comprising:

receiving data indicative of said relative importance of said data items to be embedded;

allocating an amount of a limited data embedding capacity provided by said information material in accordance with said relative importance,

encoding each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code, an amount of said redundant data, included in said encoded data items being allocated in accordance with said relative importance;

generating predetermined data sequences;

encoding said data items by modulating said predetermined data sequences with data. symbols of said data items,

combining said modulated predetermined data sequences with said information material, and

embedding control information in the information material indicative of at least one of the encoding and embedding applied to said data items,

wherein said predetermined data sequences are allocated to the effect that a greater amount of spreading of said data items is provided to the more important data items in accordance with said limited data embedding capacity.

Claim 31 (Previously Presented): A method of embedding data in information material, said data being a plurality of data items each having a different relative importance, said method comprising:

receiving data indicative of said relative importance of said data items to be embedded;

encoding each of said data items;

combining said encoded data items with said information material within a limited data embedding capacity provided by said information material, said encoding and said combining of said data items being performed in accordance with said received relative importance of said data items, to the effect that a proportion of said limited data embedding capacity is allocated to said data items in accordance with said relative importance; and

embedding control information indicative of at least one of the encoding and embedding applied to said data items.

Claim 32 (Previously Presented): A method of detecting and recovering data embedded in information, material said data being a plurality of data items each having a different relative importance, the data having been encoded and embedded in said information material within a limited data embedding capacity provided by said information material to the effect that a proportion of said limited data embedding capacity is allocated to said data items in accordance with said relative importance, and the embedded data also including control information indicative of at least one of the encoding and embedding applied to the data items, said method comprising

detecting the control information indicative of at least one of the encoding and embedding applied to the data items;

detecting said embedded encoded data items from said information material to generate a recovered version of said encoded data items; and

decoding said encoded data items using the control information to generate a recovered version of said data items in accordance with the encoding applied to said encoded data items according to the relative importance of said data items.

Claim 33 (Previously Presented): An apparatus for embedding data in information material, said data including a plurality of data items, said apparatus comprising:

a combining processor operable to combine said encoded data items with said information material, said information material providing a limited data embedding capacity; and

a control processor operable to select said data items in accordance with an order of relative importance and to control said combining processor to embed said selected data items in said information material within said limited data embedding capacity,

wherein said control processor selects said data items to the effect that more important data items are embedded before less important data items until said data embedding capacity limit is reached.

Claim 34 (Previously Presented): An apparatus as claimed in claim 33, wherein said data items include meta data describing the content or providing an indication of an attribute of said information material in which the data is embedded.

Claim 35 (Previously Presented): An apparatus as claimed in claim 34, wherein said meta data includes a Unique Material Identifier (UMID), said UMID being given a higher predetermined relative importance than other meta data.

Claim 36 (Previously Presented): An apparatus as claimed in claim 34, wherein said control processor is arranged to queue at least one data item which is not embedded within said limited data embedding capacity until sufficient data embedding capacity within said limit is available, and controls said combining processor to select at least one queued data item and embeds the selected queued data item in said information material.

Claim 37 (Original): A signal representing information material in which data has been embedded by an apparatus according to claim 1.

Claim 38 (Original): A signal representing information material in which data has been embedded by an apparatus according to claim 10.

Claim 39 (Original): A signal representing information material in which data has been embedded by an apparatus according to claim 19.

Claim 40 (Original): A computer program providing computer executable instructions, which when loaded on to a data processor configures said data processor to operate as an apparatus according to claim 1.

Claim 41 (Original): A computer program providing computer executable instructions, which when loaded on to a data processor configures said data processor to operate as an apparatus according to claim 10.

Claim 42 (Previously Presented): A computer program providing computer executable instructions, which when loaded on to a data processor configures said data processor to operate as an apparatus according to claim 19.

Claim 43 (Previously Presented): An apparatus for detecting and recovering data embedded in information material, said data comprising a plurality of source data items each having been encoded in accordance with a systematic error correction code to produce encoded data items each comprising the corresponding source data item and redundant data, said encoded data items being embedded in the information material, said apparatus comprising:

- an embedded data detector operable to detect and generate a recovered version of said encoded data from said information material;

- an error processor operable, for each of said recovered encoded data items, to determine whether said recovered encoded data item is deemed too erroneous, and if not, decoding said encoded data item to generate a recovered version of said data item;

- a data store for storing said recovered version of said data item; and

- a recovery data processor operable, if said error processor determines that one of said recovered encoded data items is deemed too erroneous, to compare the source data item of said encoded data item, with at least one other source data item from said data store, and to estimate said source data of said item erroneous encoded data item in dependence upon a corresponding value of said at least one other recovered data item.

Claim 44 (Previously Presented): An apparatus as claimed in claim 43, wherein said error processor is operable to determine whether each of said recovered encoded data items is erroneous by estimating the number of erroneous data symbols in each of said recovered

encoded data items, and to compare said number of errors with a predetermined threshold, said recovered encoded data item being determined as erroneous if said number of errors is greater than or equal to said threshold.

Claim 45 (Previously Presented): An apparatus as claimed in claim 43, wherein said recovery processor is operable to compare said source data item from said erroneous encoded data item with at least one of a previous and a subsequent decoded and recovered data item, and to replace said source data item of said erroneous encoded data item in accordance with at least one of said previous and subsequent source data items.

Claim 46 (Previously Presented): An apparatus as claimed in claim 45, wherein said recovery processor is operable, if said previous and said subsequent source data items have the same value to replace said source data item of said erroneous encoded data item with the value of said previous or subsequent data items.

Claim 47 (Previously Presented): An apparatus as claimed in claim 45, wherein said recovery processor is operable, if said previous and said subsequent source data items have different values to replace said source data item of said erroneous encoded data item with the value formed by interpolating between said previous and subsequent data items.

Claim 48 (Previously Presented): An apparatus as claimed in claim 43, comprising an analysis processor operable to compare the content of the information material from which a plurality of recovered source data items and said erroneous encoded data item have been detected, and to generate data representative of the comparison, wherein said recovery

processor is operable to estimate said source data item of said erroneous encoded data item in dependence upon said data representative of said comparison.

Claim 49 (Previously Presented): An apparatus as claimed in claim 44, wherein each of said source data items comprises a plurality of data fields, and said recovery processor is operable to compare at least one of said data fields of said erroneous encoded data item with the corresponding field of said at least one other recovered data item, and to replace said at least one of said fields of said erroneous encoded data item with the corresponding field of said recovered data item in accordance with said comparison.

Claim 50 (Previously Presented): An apparatus as claimed in claim 49, wherein said recovery processor is operable, in dependence upon at least one of said data fields of said source data item being replaced, to determine in combination with said error processor whether said recovered encoded data item in which the data held is replaced is deemed to be too erroneous, and if not, decoding said encoded data item to form a recovered version of said data item.

Claim 51 (Previously Presented): An apparatus as claimed in claim 49, wherein said recovery processor is operable, if said corresponding data field of a previous and a subsequent data items have the same value, to set said data field of said erroneous encoded data item to the value of one of said previous and subsequent data items.

Claim 52 (Previously Presented): An apparatus as claimed in claim 49, wherein said recovery processor is operable, if said corresponding data field of a previous data item and a subsequent data item have different values, to replace said data field of said erroneous

encoded data item with a value formed by interpolating between said previous and subsequent data items.

Claim 53 (Previously Presented): An apparatus as claimed in claim 49, wherein said recovery field of a previous data item and said corresponding data field of a subsequent data item, and if said difference is above a predetermined threshold to replace said data field of said erroneous encoded data item which cannot be decoded with the value of said field of said previous data item and otherwise to form said replacement value by interpolating between said field of said previous and subsequent data items.

Claim 54 (Previously Presented): An apparatus as claimed in claim 49, comprising an analysis processor operable to compare the content of the information material from which a previous data item, a subsequent data item and said erroneous encoded data items were detected, and to generate data representative of the comparison, wherein said recovery processor is, operable to replace said data field of said erroneous encoded data item which cannot be decoded with the value of said data field from one of said previous and said subsequent data items in dependence upon said comparison data.

Claim 55 (Previously Presented): An apparatus as claimed in claim 54, wherein said analysis processor is arranged to estimate the content of the information material from a color histogram or the like.

Claim 56 (Previously Presented): An apparatus as claimed in claim 43, wherein said information material is at least one of video, audio, data or audio/video material, and said

source data items include meta data describing the content or attributes relating to said video, audio, data or audio/video material.

Claim 57 (Previously Presented): An apparatus as claimed in claim 56, wherein said data items include Unique Material Identifiers (UMIDs), and said data fields are the fields of said UMID, and said encoded data items are encoded UMIDs.

Claim 58 (Previously Presented): An apparatus as claimed in claim 57, wherein the data field of an erroneous encoded UMID, which is recovered by interpolating contains data representative of the time code of said UMID.

Claim 59 (Previously Presented): An apparatus as claimed in claim 57, wherein the data field of an erroneous encoded UMID, which is recovered by replacing the data field with data from the corresponding field of the previous encoded UMID, consequent upon a difference between the data fields of the previous and subsequent recovered UMIDs being above a predetermined threshold is representative of a clip identifier of said UMID.

Claim 60-62 (Canceled).

Claim 63 (Previously Presented): A system for embedding and removing data from information material, said system comprising:

an apparatus for embedding the data into the information material, said data comprising a plurality of source data items, said apparatus for embedding comprising:

an error correction encoder operable to encode each of said data items in accordance with a systematic error correction code to produce encoded data items each comprising the source data item and redundant data; and

a combining processor operable to combine said encoded data items with said information material; and

an apparatus for detecting and removing the data from the information material, said apparatus for detecting and recovering comprising:

an embedded data detector operable to detect and generate a recovered version of said encoded data from said information material;

an error processor operable; for each of said recovered encoded data items, to determine whether said recovered encoded data item is deemed too erroneous, and if not decoding said encoded data item to generate a recovered version of said data item;

a data store for storing said recovered version of said data item; and

a recovery data processor operable, if said error processor determines that one of said recovered encoded data items is deemed too erroneous, to compare the source data item of said encoded data item, with at least one other source data item from said data store, and to estimate said source data item of said erroneous encoded data item in dependence upon a corresponding value of said at least one other recovered data item.

Claim 64 (Previously Presented): A method of detecting and recovering data embedded in information material, said data comprising a plurality of source data items each having been encoded in accordance with a systematic error correction code to produce encoded data items, each encoded data item comprising the corresponding source data item and redundant data, said encoded data items being embedded in the information material, said method comprising:

detecting and generating a recovered version of said encoded data items from said information material;

determining, for each of said encoded data items, whether the recovered version of said encoded data item is deemed too errored, and

if not, decoding said encoded data item to generate a recovered version of said data item, and storing said recovered version of said data item, and

if said erroneous encoded data item is deemed too erroneous, comparing said source data from said erroneous encoded data item with at least one other source data item from said data store, and estimating said source data item of said erroneous encoded data item in dependence upon a corresponding value of said other recovered data item.

Claim 65 (Canceled).

Claim 66 (Previously Presented): A computer program providing computer executable instructions, which when loaded on to a data processor configures said data processor to operate as an apparatus according to claim 43.

Claim 67 (Canceled).

Claim 68 (Previously Presented): A computer program product having a computer readable medium having recorded thereon information signals representative of the computer program claimed in claim 66.

Claim 69 (Canceled).

Claim 70 (Previously Presented): An apparatus for embedding data in information material, said data being a plurality of data items each having a different relative importance, said apparatus comprising:

means for receiving data indicative of said relative importance of said data items to be embedded;

means for allocating an amount of a limited data embedding capacity provided by said information material;

means for encoding each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code, an amount of said redundant data included in said encoded data items being allocated in accordance with said relative importance;

means for controlling the means for encoding and the means for combining of said data items in accordance with said relative importance to the effect that an amount of said redundant data included in said encoded data items is allocated in accordance with said relative importance to the effect that a proportion of said limited data embedding capacity is allocated to said encoded data items in accordance with said relative importance;

means for combining said encoded data items with said information material; and

means for embedding control information in the information material indicative of at least one of the encoding and embedding applied to said data items,

wherein said allocating and generating has an effect that a proportion of said limited data embedding capacity is allocated to said encoded data items in accordance with said relative importance:

Claim 71 (Previously Presented): An apparatus for embedding data in information material, said data being a plurality of data items each having a different relative importance, said apparatus comprising:

means for receiving data indicative of said relative importance of said data items to be embedded;

means for allocating an amount of a limited data embedding capacity provided by said information material in accordance with an application strength;

means for encoding each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code, an amount of said redundant data included in said encoded data items being allocated in accordance with said relative importance;

means for combining said encoded data items with said information material;

means for embedding control information in the information material indicative of at least one of the encoding and embedding applied to said data items,

wherein said allocating and generating has an effect that a proportion of said limited data embedding capacity is allocated to said encoded data items in accordance with said relative importance and said application strength are allocated to said encoded data items in accordance with said relative importance.

Claim 72 (Previously Presented): An apparatus for embedding data in information material, said data being a plurality of data items each having a different relative importance, said apparatus comprising:

means for receiving data indicative of said relative importance of said data items to be embedded;

means for allocating an amount of a limited data embedding capacity provided by said information material;

means for encoding each of said data items in accordance with at least one error correction code, said encoded data items including redundant data introduced by said error correction code, an amount of said redundant data included in said encoded data items being allocated in accordance with said relative importance;

means for generating predetermined data sequences;

means for encoding said data items by modulating said predetermined data sequences with data symbols of said data items; and

means for combining said modulated predetermined data sequences with said information material,

wherein said predetermined data sequences are allocated to the effect that a greater amount of spreading of said data items is provided to the more important data items in accordance with said limited data embedding capacity.

Claim 73 (Previously Presented): An apparatus for embedding data in information material, said data being a plurality of data items each having a different relative importance, said apparatus comprising:

means for receiving data indicative of said relative importance of said data items to be embedded;

means for encoding each of said data items;

means for combining said encoded data items with said information material within a limited data embedding capacity provided by said information material,

said encoding and said combining of said data items being performed in accordance with said received relative importance of said data items, to the effect that a proportion of

said limited data embedding capacity is allocated to said data items in accordance with said relative importance; and

means for embedding control information indicative of at least one of the encoding and embedding applied to said data items.

Claim 74 (Previously Presented): An apparatus for detecting and recovering data embedded in information material, said data being a plurality of data items each having a different relative importance, the data having been encoded and embedded in said information material within a limited data embedding capacity provided by said information material to the effect that a proportion of said limited data embedding capacity is allocated to said data items in accordance with said relative importance, the embedded data also including control information indicative of at least one of the encoding and embedding, applied to the data items, said apparatus comprising:

means for detecting the control information indicative of at least one of the encoding and embedding applied to the data items;

means for detecting said embedded encoded data from said information material to generate a recovered version of said encoded data; and

means for decoding said encoded data items using the control information to generate a recovered version of said data items in accordance with the encoding applied to said encoded data items according to the relative importance of said data items.

Claim 75 (Previously Presented): An apparatus for detecting and recovering data embedded in information material, said data comprising:

a plurality of source data items each having been encoded in accordance with a systematic error correction code to produce encoded data items, each encoded data item

comprising the corresponding source data item and redundant data, said encoded data items being embedded in the information material, said apparatus comprising:

means for detecting and generating a recovered version of said encoded data items from said information material;

means for determining, for each of said encoded data items, whether the recovered version of said encoded data item is deemed too erroneous;

means for decoding said encoded data item if said encoded data item is not too erroneous, to generate a recovered version of said data item, and storing said recovered version of said data item, and if said erroneous encoded data item is deemed too erroneous; and

means for comparing said source data from said erroneous encoded data item with at least one other source data item from said data store, and means for estimating said source data item of said erroneous encoded data item in dependence upon a corresponding value of said other recovered data item.

Claim 76 (Canceled).